

13. (amended) The method of claim 1 or 2 wherein the one or more photoacid generator compounds are onium compounds, imidosulfonate compounds, N-sulfonyloxyimide compounds, sulfonate ester compounds, nitrobenzyl compounds, disulfone compounds, and/or halogenated non-ionic compounds, or mixtures thereof.

14. (amended) The method of claim 1 or 2 wherein the one or more photoacid generator compounds produce a halo-alkyl sulfonic acid upon exposure to activating radiation.

15. (amended) The method of claim 1 or 2 wherein the one or more photoacid generator compounds produce a perfluoro sulfonic acid upon exposure to activating radiation.

16. (amended) The method of claim 1 or 2 wherein the resin comprises a polymer that contains phenolic units.

17. (amended) The method of claim 1 or 2 wherein the resin comprises a polymer that contains phenolic and photoacid-labile alkyl acrylate units.

18. (amended) The method of claim 1 or 2 wherein the resin comprises a polymer that contains 1) phenolic units, 2) phenyl units, and 3) photoacid-labile alkyl acrylate units.

19. (amended) The method of claim 1 or 2 wherein the resin comprises a polymer that contains acetal, ketal or ortho ester groups.

REMARKS

Applicants appreciate the indication of allowable subject matter, i.e., that claim 4 would be allowable if rewritten in independent form.

Claims 4, 5, 6 and 20-40 have been cancelled without prejudice. Claims 1, 2 and 7-19 have been amended. No new matter has been added by virtue of the amendments.

Claims 7-19, 27-35 and 38-40 were objected to as being in improper multiple dependent form.

The claim dependency has been formalized by the amendments made herein.

Claims 21-26 were rejected under 35 U.S.C. 112, second paragraph.

While Applicants disagree with the rejection, claims 21-26 also have been cancelled without prejudice. It is thus believed the rejection is properly withdrawn.

Claims 1-3, 5, 6, 20-23 and 25 were rejected under 35 U.S.C. 102 over Ikemura et al. (U.S. Patent 6,235,446).

Claims 23, 24 and 26 were rejected under 35 U.S.C. 103 over Ikemura et al. (U.S. Patent 6,235,446).

Claims 1-3, 5, 6, 20-22 and 25 were rejected under 35 U.S.C. 102(e) over Chiba et al. (U.S. 6,280,900).

Claims 36 and 37 were rejected under 35 U.S.C. 102 over Lin et al. (U.S. Patent 6,187,505).

For the sake of brevity, the several section 102 and 103 rejections are addressed in combination.

While Applicants disagree with the rejection, the two pending independent claims (claims 1 and 2) have been amended to incorporate features of claim 4, which claim was indicated to be allowed.

In view thereof, reconsideration and withdrawal of the rejections is requested.

It is believed the application is in condition for immediate allowance, which action is earnestly solicited.

Respectfully submitted,



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MARKED VERSION TO SHOW CHANGES

1. (amended) A method for forming a photoresist relief image on a substrate comprising:

(a) applying a coating layer of a chemically-amplified positive photoresist composition on a substrate, the photoresist composition comprising a resin and one or more photoacid generator compounds, wherein the one or more photoacid generator compounds are present in a concentration of at least about 5 weight percent based on weight of total solids of the photoresist composition:

(b) exposing the photoresist coating layer to EUV radiation [having a wavelength of less than about 160 nm, or electron beam or ion beam radiation].

2. (amended) A method for forming a photoresist relief image on a substrate comprising:

(a) applying a coating layer of a chemically-amplified positive photoresist composition on a substrate, the photoresist composition comprising a phenolic resin and one or more photoacid generator compounds, the resin comprising at least three distinct repeat units;

(b) exposing the photoresist coating layer to EUV radiation having a wavelength of less than about 160 nm, or electron beam or ion beam radiation.

7. (amended) The method of claim 1 or 2 [any one of claims 1 through 6] wherein the one or more photoacid generator compounds are present in a concentration of at least about 6 weight percent based on weight of total solids of the photoresist composition.

8. (amended) The method of claim 1 or 2 [any one of claims 1 through 6] wherein the one or more photoacid generator compounds are present in a concentration of at least about 8[, 9 or 10] weight percent based on weight of total solids of the photoresist composition.

9. (amended) The method of claim 1 or 2 [any one of claims 1 through 8] wherein the one or more photoacid generator compounds are present in a concentration up to about 12 weight percent based on weight of total solids of the photoresist composition.

10. (amended) The method of claim 1 or 2 [any one of claims 1 through 6] wherein the one or more photoacid generator compounds are present in a concentration of from about 10 to about 15 weight percent of total solids of the photoresist composition.

11. (amended) The method of claim 1 or 2 [any one of claims 1 through 10] wherein the one or more photoacid generator compounds are ionic compounds.

12. (amended) The method of claim 1 or 2 [any one of claims 1 through 10] wherein the one or more photoacid generator compounds are non-ionic compounds.

13. (amended) The method of claim 1 or 2 [any one of claims 1 through 10] wherein the one or more photoacid generator compounds are onium compounds, imidosulfonate compounds, N-sulfonyloxyimide compounds, sulfonate ester compounds, nitrobenzyl compounds, disulfone compounds, and/or halogenated non-ionic compounds, or mixtures thereof.

14. (amended) The method of claim 1 or 2 [any one of claims 1 through 10] wherein the one or more photoacid generator compounds produce a halo-alkyl sulfonic acid upon exposure to activating radiation.

15. (amended) The method of claim 1 or 2 [any one of claims 1 through 10] wherein the one or more photoacid generator compounds produce a per-fluoro sulfonic acid upon exposure to activating radiation.

16. (amended) The method of claim 1 or 2 [any one of claims 1 through 15] wherein the resin comprises a polymer that contains phenolic units.

17. (amended) The method of claim 1 or 2 [any one of claims 1 through 15] wherein the resin comprises a polymer that contains phenolic and photoacid-labile alkyl acrylate units.

18. (amended) The method of claim 1 or 2 [any one of claims 1 through 15] wherein the resin comprises a polymer that contains 1) phenolic units, 2) phenyl units, and 3) photoacid-labile alkyl acrylate units.

19. (amended) The method of claim 1 or 2 [any one of claims 1 through 18] wherein the resin comprises a polymer that contains acetal, ketal or ortho ester groups.